Remarks

Claims 1- 17 were pending in the application and were under rejection. Claims 1, 11, 14, 15, and 17 are amended herewith. Claims 1-17 remain in the application.

Regarding the rejections of claims 14, 15 and 17 under 35 USC 112, applicants have amended those claims to obviate the rejections. Specifically with respect to the rejection of claim 14, applicants respectfully submit that the rejection is felt to have been not well founded, but the amended language should remove any question. More to the point, claim 13 said water is injected when the temperature (of the oxidant stream) "exceeds a threshold..". Why is that language not "vague and unclear", for it gives no specific temperature guidance at all? On the other hand, the challenged language of claim 14 said that such "temperature threshold is in the range of about 85^0 to 90^0 F". The language of claim 14 merely made claim 13 more specific by saying the threshold (emphasis added) is within the narrow range of "about 85^0 to 90^0 F". This is another way of saying the threshold is not set as low as 50^0 or as high as 100^0 F, but rather is within in the narrow range specified. Applicants submit that the original language was sufficient, but that the amended language says the same thing and should be more acceptable to the Examiner.

Claims 1-3 and 9-11 were rejected under 35 USC 102(b) as being anticipated by Grasso et al 6274259 (hereinafter either "Grasso" or "the Grasso reference" or " '259" or the " the '259 reference"). Applicants respectfully traverse such rejection, and submit that those claims as now amended and especially in view of the following comments, clearly and patentably distinguish over the '259 reference. The Grasso reference was that described at the bottom of page 4 and all of page 5 of the present application in describing the Background art. Note on page 5, lines 29-33 that the liquid transfer medium of the Grasso reference was characterized as "simply ... trapped in the fine pore enthalpy exchange barrier in an adequate amount or, if necessary, may be re-supplied from a supply reservoir". This latter aspect was descriptive of the fluid from reservoir 112 of Grasso being supplied via feed line 116 to the barrier 12. Applicants are, and were, aware of this characteristic of the Grasso reference. Nevertheless, as noted at the

top of page 6 of the present application, such provisions may simply not be adequate to prevent certain shortcomings of that prior art in the event of particularly arid and /or hot conditions of the environment. Because any water delivered to the oxidant stream in the Grasso reference must come by way of evaporation through the 0.1 to 100 micron pores of the enthalpy exchange barrier, that delivery is necessarily limited.

The present invention overcomes the abovementioned shortcomings by introducing a liquid medium, such as water, to the process oxidant stream without the restrictive flow limitations of a fine pore barrier. That liquid medium is dispensed, or injected, substantially directly into the oxidant stream, preferably as or just before the oxidant stream enters the "second gas flow channel" of the "energy recovery device". This arrangement and process clearly differ from, and may be viewed as supplemental to, the provision of water/liquid to the enthalpy exchange barrier that separated the 1st and 2nd gas flow channels in the energy recovery device of the Grasso reference. Indeed, while the present invention assumes the presence of a liquid transfer medium in the fine pore support structure of the enthalpy exchange barrier 46 of ERD 32 to prevent bulk gas flow between the two gas channel and to facilitate transfer of heat and some moisture (mass) between channels (page 11, line 24 to page 13, line 20), it also further provides (page 13, line 21 to page 14, line 4) for the injection of water into the oxidant stream to supplement the moisture from the enthalpy exchange barrier 46.

This supplemental delivery of water to the oxidant stream may be regulated as to flow rate and/or temperature of the water delivered. Moreover, its delivery may be regulated as a function of oxidant temperature and or humidity, to compensate for excess dryness, amongst other conditions (pages 14-18). These techniques and properties simply are not addressed in the Grasso reference.

To further emphasize this difference in the both the structure and method which comprise the present invention, applicants have amended both independent claims 1 and 11 to include the provision that the liquid medium/water is dispensed/injected "substantially directly (emphasis added) into the process oxidant stream preparatory to

the process oxidant passing through the energy recovery device second gas flow channel". Though the arguments above should alone be persuasive in establishing the difference between the structure, function, and teaching of the present application relative to that of the Grasso reference, applicants have taken the further step of introducing the language "substantially directly" mentioned above. Applicants' claim 1 provides an ERD (32) having an enthalpy exchange barrier (46), and then claims the further "means (58, 60) for injecting the liquid medium substantially directly into the process oxidant stream". Clearly, this defines structure that is distinct and patentably different.

The Examiner's note that appears in the paragraph bridging pages 4 and 5 in which the Examiner construes the claim language "injection means disposed to inject a liquid medium" as failing to invoke 35 USC 112 6th paragraph. Applicants' attorney confesses to some confusion with respect to such position, particularly as this area of the case law appears to be constantly changing. In an effort to address this expressed concern, applicants' attorney has amended claim 1 such that the language quoted above now reads "means for injecting the liquid medium". It is believed this now comports with the requirements of 35 USC 112 6th paragraph, though applicants' attorney does not believe it changes the meaning or content of claim 1 in the least bit. If this thinking is astray, perhaps the Examiner would be kind enough to provide further guidance.

While it is believed the foregoing discussion and amendments with respect to claims 1 and 11 render those claims, and thus the claims depending therefrom, patentable, further attention will also be given to the several additional references used to reject the dependent claims. On page 5 of the Office Action, concerning claims 2 and 3, it is suggested that feed line 116 of the Grasso reference introduces a liquid medium into chamber 102 and that such introduction is somehow upstream of the inlet to the energy recovery device through which the process oxidant stream flows (as required by claims 2 and 3). This simply is not so. As discussed above, feed line 116 delivers water to the enthalpy exchange barrier 112 where it may evaporate into the oxidant stream at a limited and sometimes insufficient rate leading to dry-out of the leading edge. It is the very flow of that gas stream past the barrier that occasions the evaporation. This limitation is

overcome by injecting the liquid (water) substantially directly into the oxidant stream "preparatory to" (i, e, at or prior to the beginning of) the process oxidant passing through the energy recovery device. This assures that sufficient water is delivered and that it occurs early enough in the gas flow path that the dry-out condition may be avoided. The structure and function of the Grasso reference simply do not have that characteristic, and it contains no teaching or suggestion of such.

Claims 4 and 5 are rejected under 35 USC 103(a) as being an obvious from a combination of the Grasso reference and the Saito reference. This position is rejected initially by applicants, of course, for the deficiencies in the structure and teachings of the Grasso reference discussed above. Secondly, this position is rejected because the teaching in Saito of a water spray nozzle injecting water into an exhaust gas stream "so as to provide an even greater moisture content to the matrix of the ERD" [0060] is not a teaching of injecting water to the inlet oxidant stream just at, or prior to, the stream's entry to the ERD to prevent drying of the barrier's leading edge.

Claims 6-7 and 12 -17 are rejected under 35 USC 103(a) as being obvious from a combination of the Grasso reference and the Dickman reference. This position is rejected initially by applicants, of course, for the deficiencies in the structure and teachings of the Grasso reference discussed above. Secondly, this position is rejected because while the Dickman reference does disclose "a control system 90 including a controller 92 that directs operation responsive to programmed instructions and/inputs from sensors and user inputs", the limitations of the rejected claims are far more specific than that. The rejection of the Office Action further states that the Dickman "controller 92 communicates with a sensor assembly 94 that monitors such variables as as the temperature and fluid level in vessel 86", and then proceeds to give greater detail of the nature of the Dickman control. While the Examiner's characterization of what the Dickman reference may disclose in the context of that particular system may be accurate, it certainly does not disclose or teach the control structure and technique claimed in the present application. For starters, applicants fail to find any mention in Dickman of a process oxidant stream for supplying process oxidant to a fuel cell for electrochemical reaction therewithin, yet it is that stream

into which liquid/water is injected by the present invention under the direction of the present control scheme to achieve desired humidification conditions in portions of the system. The Dickman reference is concerned with the regulation of temperatures and flows of fluids associated with a heat reservoir 32. That is simply not the concern or objective of the present invention. Rather, claims 6-8 and 12-17 are concerned with controlling the timing/amount and/or temperature of liquid/water being injected into the process oxidant stream preparatory to that stream passing through the ERD (32) and by the barrier (46). Moreover, some of those claims are further limited with respect to sensing the temperature and/or humidity of the ambient process oxidant to effect the requisite regulation of the process oxidant stream. Nowhere in the Dickman reference is there such teaching. With respect to claim 14 and the narrow temperature range of the process oxidant stream that establishes the threshold above which water is injected into the stream, the Dickman reference simply contains no teaching. The mention in Dickman, at Col. 7, lines 28-34, of water being heated from 50^0 to 115^0 simply is not a teaching of injecting water into the process oxidant stream when the temperature of that stream exceeds a temperature in the limited range of about $85^0 - 90^0$ F.

Finally, with respect to claims 7 and 8, the Examiner adds a third reference (Balasubramanian) to the preceding combination of Grasso and Dickman in an attempt to suggest the obviousness of using temperature and humidity sensors to sense the temperature and humidity of the process oxidant (for use in controlling injection of water into the process oxidant). Yet reference to the cited language in Col 4, lines 14-25 of Balasubramanian appears to disclose only the monitoring of such characteristics of undisclosed media in order to regulate fuel cell temperature. This disclosure in Balasubramanian fails to bridge the gaps discussed above.

It is respectfully submitted that the foregoing arguments/comments, in further view of the accompanying amendments of claims 1, 11, 14, 15, and 17, clearly distinguish the patentability of all of the claims over the cited references. Accordingly, entry of this amendment, favorable reconsideration, and an indication of allowance are respectfully solicited. In the event the Examiner feels the prosecution of the application may be

advanced by telephone interview, he is respectfully requested to contact applicants' attorney at the number below.

Respectfully submitted,

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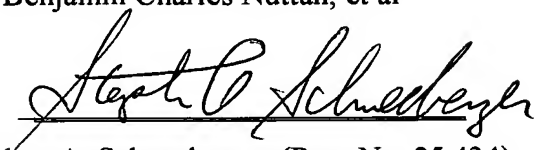
By: 

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